NOTEWORTHY PLANT SPECIES FROM THE OKEFENOKEE SWAMP, GEORGIA—The Okefenokee Swamp is located on the Atlantic Coastal Plain in southeast Georgia and northeast Florida. The swamp surface area of 3826 km^2 includes parts of Ware, Clinch, Charlton, and Echols counties, Georgia, and Baker County, Florida. There are a number of distinct habitat types within the swamp, including swamp forests, tree and shrub islands, grass-sedge marshes, emergent macrophyte marshes, and open lakes (Greening & Gerritsen 1987). Sand and peat are the two soil types in the swamp. Marine or lacustrine sandy soils occur in large islands, uplands, and immediately east of the Suwannee River Sill, i.e. a low earthen dam impounding the Suwannee River (Parrish & Rykiel 1979). The majority of the swamp substrate is peat (96% organic matter) up to 5m deep (Cohen 1973).

The flora of Okefenokee has been of interest to botanists since the early 1900s when Roland M. Harper made the first extensive investigation of the swamp vegetation (Trowell 1988). Over the following years further description of the swamp flora has been provided by Wright and Wright (1932), Cypert (1961; 1972; 1973), and Schlesinger (1978). The most comprehensive checklist of the vascular plants of Okefenokee was compiled by Loew and Jones (1984) from plant surveys conducted during the growing seasons of August 1978–September 1980. Their checklist documents 101 species of vascular plants representing 53 families.

The large surface area and inaccessibility of remote regions of the Swamp have hindered comprehensive botanical surveys. As a result a few species, particularly sedges, have been overlooked. This manuscript documents species which should be added to the checklist of vascular plants occurring in the Okefenokee Swamp, Georgia.

The observations reported herein result from more than two years (July 1992–December 1994) of collecting and observations made in conjunction with a project entitled "The Effects of Hydrologic Alterations on the Ecology of the Okefenokee Swamp" (Loftin et al., unpublished data). Plants were collected by various methods. Many specimens were collected during species composition, biomass, and cover estimates along 80 permanent transects established in four emergent macrophyte prairies (Chesser, Durdin, Floyd's, and Sapling Prairies), and the Suwannee River floodplain near the Sill. Some specimens were obtained as seedlings germinating from soil cores collected along the permanent transects. These soil cores were used in seed bank experiments, and seedlings were germinated from the cores under greenhouse conditions near the Suwannee Canal Recreation Area (Charlton Co., Georgia). Before harvesting the sample, the seedlings were grown un-

til an inflorescence was produced. Many specimens were also collected during routine forays in and around the swamp.

NOTEWORTHY SPECIES

The following is a list of nine noteworthy species collected from the Okefenokee Swamp during the course of our investigations. Although most specimens (except *Rhynchospora alba)* are fairly common species reported previously in Georgia, there is no documentation for these species from the Okefenokee Swamp. These species should be added to the checklist of vascular plants of Okefenokee. Voucher specimens for those species described herein have been donated to the herbaria of the University of Georgia, Athens (GA), and the University of Florida, Gainesville (FLAS). As noted previously, some specimens were obtained from soil cores during seed bank experiments. For these specimens, the locality stated is the site were the soil core was obtained. Although all species described herein were observed in the field, the soil core specimens were of herbarium-quality. Nomenclature follows that of Godfrey and Wooten (1979a, b).

Poaceae

Erianthus giganteus (Walt.) Muhl. Georgia. Charlton Co.: 1.6 km N of Dinner Pond, 500 mi E of Sapling Prairie boat trail, 15 Dec 1994, *Loftin & O'Neill 138* (GA); Floyd's Prairie, Okefenokee NWR, 28 Oct 1992, *Williges & Loftin 20a* (FLAS); *Williges & Loftin 20b* (GA). *Erianthus giganteus* is a cool season grass flowering September–October (Radford et al. 1968). It is fairly common and found growing throughout most prairies of the swamp. Although Loew and Jones (1984) reported collecting *E. brevibarbus* Michx. during their surveys, we have yet to observe this species in the field. Because Loew and Jones (1984) collected during the growing season, they may have overlooked *E. giganteus* since it is most conspicuous in the fall. It is questionable whether *E. brevibarbus* actually occurs in the swamp. *E. giganteus* has been previously reported from Charlton County (Jones & Coile 1988).

Cyperaceae

Carex verrucosa Muhl. Georgia. Ware Co.: 650 m E of Craven's Hammock Island, 300 rn S of Craven's Lake, 14 Jan 1993, *Williges & Loftin 46* (FLAS); Suwannee Creek Bridge on Swamp Perimeter Road, ca 200 m S of Piney Woods Lake, 200 m N of Suwannee Lake, 31 Aug 1993, *Williges & O'Neill 2.09* (GA). Because this species prefers sandy sites in the refuge, it is not found in the "swamp proper," i.e. where peat soils predominate. For this reason, it has been excluded from previous swamp studies. Since this

species is common in relatively shallow water east of the Suwannee River Sill, it should be included in the flora of Okefenokee. These specimens represent new records for Ware County (Jones & Coile 1988).

Cyperus erythrorhizos Muhl. Georgia. Charlton Co.: ca 900 m E of the Suwannee River Sill, 900 m S of Mack's Island, 16 Sep 1993, *Williges, Loftin & O'Neill 111* (GA), *Williges, Loftin & O'Neill 1.12* (FLAS). Although these voucher specimens were grown from soil cores, this species has been observed growing in disturbed swamp sites, such as floating peat recently dredged from the canoe trails of Chesser Prairie. These specimens are new records for Charlton County (Jones & Coile 1988).

Eleocharis vivipara Link. Georgia. Charlton Co.: ca 20 m E of the Sapling Prairie Boat Trail, 2.4 km N of Dinner Pond, 25 May 1993, *Williges, Loftin, & O'Neill 68* (FLAS); Georgia. Ware Co.: ca 3.5 km *NE* of Suwannee River Sill, on Craven's Hammock Canoe Trail, 19 Apr 1994, *Williges & O'Neill 127* (GA). These specimens represent the few *E. vivipara* we observed with mature spikelets. *Eleocharis vivipara* is one of four spikerush species that reproduce vegetatively by shoots produced from sterile spikelets at the culm apex (Ward & Leigh 1975). Submersed mats of vegetatively reproducing *Eleocharis* are common directly east of the Suwannee River Sill. Most of our collections in this area are either *E. vivipara* or undetermined species. Loew and Jones (1984) reported collecting *E. baldwinii* (Torr.) Chapm., also a submersed, vegetatively reproducing species. We suspect that both *E. vivipara and E. baldwinii* are found in the swamp, and possibly a third species, *E. microcarpa* Torr., with species dominance determined by hydrologic conditions.

Rhynchospora alba (L.) Vahl. Georgia. Charlton Co.: Durdin Prairie ca 1.5 km S of Flag Lake, 100 rn W of boat trail, 16 Sep 1993, *Williges, Loftin & O'Neill 110* (FLAS); Durdin Prairie ca 300 rn SE of Durdin Lake, 100 m NE of boat trail, 24 Sep 1993, *Williges, Loftin & O'Neill 114* (GA). These specimens represent the first records of this species from Southeast Georgia and are the southernmost records in the U.S. Prior records of *R. alba* exist for Rabun County in the Blue Ridge province of northeast Georgia (Duncan & Kartesz 1981). Of interest is that the habitat of *R. alba* in Okefenokee is not what is commonly associated with this species in other regions. According to Gale (1944), *R. alba* is considered rare in Virginia, and found southward only in scattered mountain bogs of West Virginia, North Carolina, and Puerto Rico. Godfrey and Wooten (1979a) state this species is found in open, sphagnous bogs from Newfoundland to Maryland, and south in the mountains to North Carolina. Radford et al. (1968) report this species is very rare in North Carolina. Our voucher specimens were germi-

nated from soil cores collected from Durdin Prairie. Although it is not common, we have observed *R. alba* growing in the southern edge of Durdin Prairie, where the white scales of this species make it fairly conspicuous. Durdin Prairie is one of the least studied regions of the swamp. The unstable floating vegetation mats characteristic of the prairie make travel in this area extremely difficult without the aid of air boats. For this reason few plant investigations have been done in this region, which may explain why this species has been overlooked. We have also found this species reproducing in Southeast Chesser Prairie. Although this prairie in general has a more solid, submersed peat substrate, the prairie fringe consists of floating peat mats similar to those found throughout Durdin Prairie. The Chesser Prairie samples were found in this floating peat mat fringe.

Rhynchospora cephalantha Gray. Georgia. Charlton Co.: Floyd's Island Prairie, 700 m E of Suwannee River, 100 m N of Floyd's Prairie Canoe Trail, 20 Jul 1993, *Williges & Loftin 88* (FLAS); *Williges & Loftin 89* (GA). Loew and Jones (1984) reported collecting four species of *Rhynchospora: R. fascicularis* (Michx.) Vahl, *R. inundata* (Oakes) Fern., *R. microcephala* Britt. ex Small, and *R. wrightiana* Boeck. *Rhynchospora cephalantha* and *R. microcephala* are similar in general features and are not always distinguishable (Godfrey & Wooten 1979a). Records of *R. phalantha* have been reported from Charlton and Echols counties (Jones & Coile 1988). Although we have not observed *R. microcephala* in the swamp, it is possible both species are present. Therefore, it is likely that six species of *Rhynchospora* occur in the Okefenokee Swamp.

Scleria reticularis Michx. Georgia. Charlton Co.: Floyd's Island Prairie, ca 700 m E of Suwannee River, 100 rn N of Floyd's Prairie Canoe Trail, 18 Aug 1993, *Williges, Loftin & O'Neill 102* (FLAS). Ware Co.: Chesser Prairie, ca 700 m W of Seagrove Lake, 700 rn E of boat trail, 4 Aug 1993, *Williges, Loftin & O'Neill 100* (GA). These specimens were germinated from soil cores and represent new records for Ware and Charlton counties (Jones & Coile 1988). *Scleria reticularis* has also been found on exposed, floating peat mats in south Chesser Prairie. Its occurrence in the field corresponds to periods of summer drawdown, when the peat surface becomes exposed.

Juncaceae

Juncus repens Michx. Georgia. Charlton Co.: Suwannee River Sill area, ca 300 m E of Middle Island, 24 May 1993, *Williges, Loftin & O'Neill 62* (FLAS); Suwannee River Sill area, ca 1100 m SE of Pine Island, 24 May 1993, *Williges, Loftin & O'Neill 63* (GA). These voucher specimens were germinated from soil cores in which they produced a diagnostic inflorescence.

This species is commonly found in relatively shallow water and sandy soils near the Suwannee River Sill and the Craven's Hammock canoe trail. We have observed only the submersed form in the field, spreading by rooting at the nodes, without flowering stems. It usually does not flower unless exposed during a drawdown (Godfrey & Wooten 1979a). This species is not found in the swamp proper, but should be included in the Okefenokee flora due to its commonness within the refuge. *Junucs repens* has been previously collected from Charlton and Ware counties (Jones & Coile 1988).

Onagraceae

Ludwigia alata Ell. Georgia. Charlton Co.: Suwannee River Sill area, ca 300 m E of Middle Island, 19 Jul 1993, *Williges, Loftin & O'Neill 83* (FLAS); *Williges, Loftin & O'Neill 84* (GA). This species is frequent in sandy soils near the Suwannee River Sill. *Ludwigia alata* is usually found along the edge of canoe trails in relatively shallow water, frequently established on floating logs, and produces numerous, submersed, basal stolons. Previous field collections consisted of the stoloniferous form only, and it was not until our voucher specimens germinated from soil cores that we obtained specimens with mature flowers. It is a frequently occurring plant in the western portions of the refuge on sandy sites. These specimens are new records for Charlton County (Jones & Coile 1988).

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